

Notice of Allowability

Application No.

09/720,907

Examiner

L. E. Crane

Applicant(s)

PON ET AL.

Art Unit

1623

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to the amendment filed April 14, 2005.
2. ☒ The allowed claim(s) is/are 1,16-21,23-26,36-38,43-53,68-73,75-78,88-90,95-106,119-126,131-144,157-164 and 169-187.
3. ☒ The drawings filed on 10 July 2001 are accepted by the Examiner.
4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☒ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

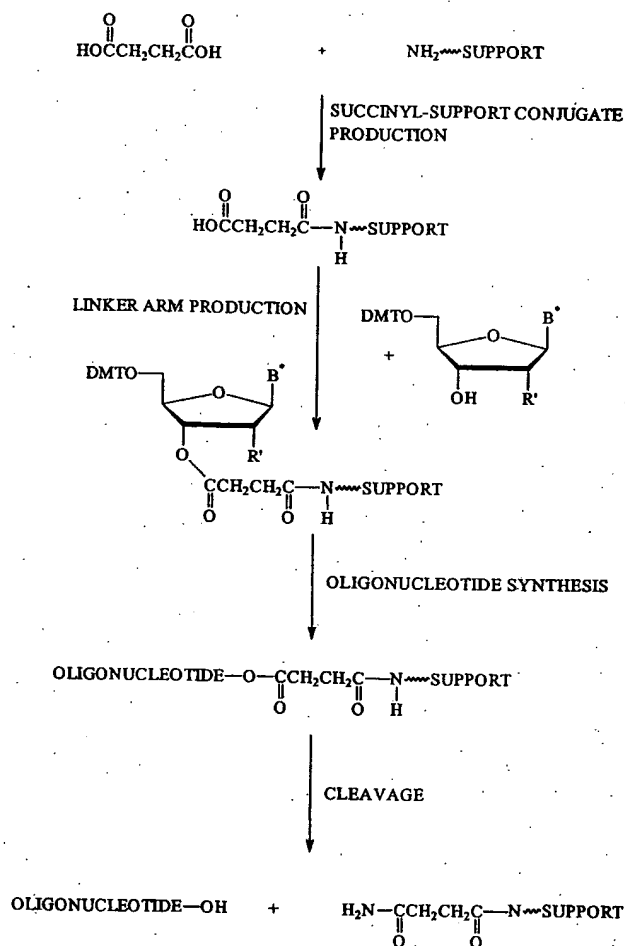
1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit
of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☒ Interview Summary (PTO-413),
Paper No./Mail Date 06012005.
7. ☒ Examiner's Amendment/Comment
8. ☐ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

5-0-0

An Examiner's Amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 C.F.R. §1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the Issue Fee.

The following was inserted in place of the submitted abstract:

-- A reusable linker arm for solid support oligonucleotide synthesis, the linker arm comprising formula (a) wherein Z is a linker moiety and T is an organic radical. A method for adding one or more nucleosides on the linker arm is also described.



In the specification, the following paragraph was inserted at page 1, before line 1 of the disclosure:

-- This application is a 371 application of PCT/CA99/00600, filed June 30, 1999 which claims the benefit of provisional application US 60/091,683, filed July 2, 1998, now abandoned. -- .

At page 22, at lines 6-7, the term “ , the contents of each of which are incorporated by reference” was deleted.

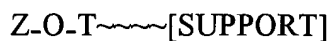
At page 24, at line 4, the term “ , the contents of which are hereby incorporated by reference” was deleted.

At page 28 at line 6, the term “ , incorporated by reference hereinabove” was deleted.

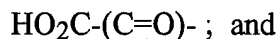
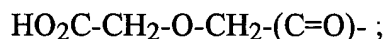
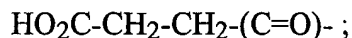
At page 33, at lines 27-28, the term “ , the contents of which are hereby incorporated by reference” was deleted.

In the claims, claim 1 was replaced entirely by the following:

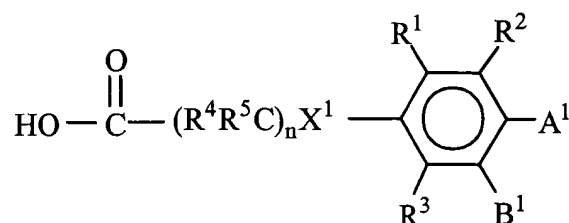
-- 1. A reusable linker arm for solid support oligonucleotide synthesis, the linker arm consisting of the following formula:



wherein Z is selected from the group consisting of:



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wherein: R^1 , R^2 and R^3 are the same or different and are selected from the group consisting of hydrogen, halide, a substituted or unsubstituted C_1 - C_{20} alkyl group, an substituted or unsubstituted C_5 - C_{30} aryl group and a substituted or unsubstituted C_5 - C_{40} alkylaryl group;

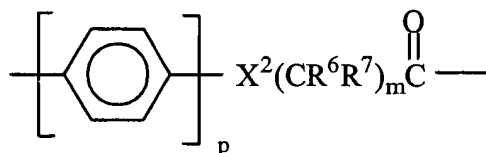
R^4 and R^5 are the same or different and are selected from the group consisting of hydrogen, a substituted or unsubstituted C_1 - C_{20} alkyl group, an substituted or unsubstituted C_5 - C_{30} aryl group and a substituted or unsubstituted C_5 - C_{40} alkylaryl group;

X^1 is selected from the group consisting of -O-, -S-, -C(O)-, -S(O)₂-, and -N(R)-;

R is selected from the group consisting of hydrogen, a substituted or unsubstituted C_1 - C_{20} alkyl group, an substituted or unsubstituted C_5 - C_{30} aryl group and a substituted or unsubstituted C_5 - C_{40} alkylaryl group;

n is 0, 1 or 2;

and one of A^1 and B^1 is selected from the group consisting of hydrogen, halide, a substituted or unsubstituted C_1 - C_{20} alkyl group, an substituted or unsubstituted C_5 - C_{30} aryl group and a substituted or unsubstituted C_5 - C_{40} alkylaryl group and the other of A^1 and B^1 has the formula:



wherein p is 0 or 1;

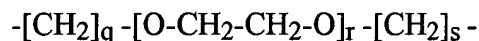
X^2 is selected from the group consisting of -O-, -S-, -C(O)-, -S(O)₂-, and -N(R)-;

R is selected from the group consisting of hydrogen, a substituted or unsubstituted C_1 - C_{20} alkyl group, an substituted or unsubstituted C_5 - C_{30} aryl group and a substituted or

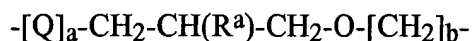
unsubstituted C₅-C₄₀ alkylaryl group;

R⁶ and R⁷ are the same or different and are selected from the group consisting of hydrogen, a substituted or unsubstituted C₁-C₂₀ alkyl group, an substituted or unsubstituted C₅-C₃₀ aryl group and a substituted or unsubstituted C₅-C₄₀ alkylaryl group;

and T has the formula:

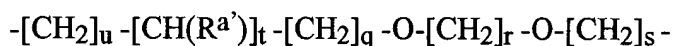


wherein q and s are the same or different and each is an integer having a value of 0-40 and r is an integer having a value of 1-200 or T has the formula:



wherein a is 0 or 1,

R^a is selected from -OH, -NH₂, -NHR and -OR wherein R is a protecting group and b is an integer having a value of 0-40, and Q is moiety having the formula:



wherein q, r, s, t and u are the same or different and each is an integer having a value of 0-40 and R^{a'} is selected from the group consisting of hydrogen, hydroxyl, a C₁-C₄₀ alkyl group, a C₅-C₄₀ aryl group, a C₁-C₄₀ alkoxy group, a C₁-C₄₀ ester group, a C₁-C₄₀ hydroxy-containing group, a C₂-C₄₀ acrylate-containing group, a C₅-C₄₀ alkylaryl group, -NH₂, -NHR and -OR, wherein R is a protecting group; and

wherein the term SUPPORT is defined as an organic or an inorganic substance. --

In claim 18 at lines 5 and 6, the term "R^a" (both occurrences) was amended to read -- R^{a'} --.

In claim 21 at line 3, the term "dialkylphosphite," was deleted.

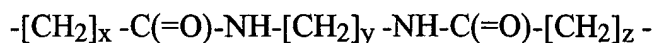
In claim 21 at line 10, the terms "dimethoxybenzoin," "dimethoxybenzoin carbonate," and "methylnitropiperonyl carbonate," were deleted.

In claim 24 at line 4, the term "Q is an organic moiety" was deleted.

In claim 36 at lines 1-2, the term "organic moiety" was amended to read -- moiety Q --.

Claim 38 was replaced entirely by the following:

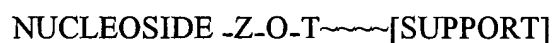
-- 38. The reusable linker arm defined in claim 18 wherein Q is additionally defined as having the formula:



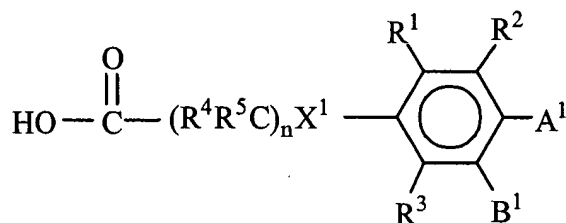
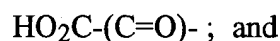
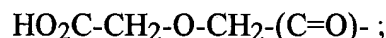
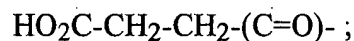
wherein each of x, y and z is an integer having a value of 1-40. --

Claim 53 was replaced entirely by the following:

-- 53. A reusable linker arm for solid support oligonucleotide synthesis consisting of the following formula:



wherein Z is selected from the group consisting of:



wherein: R¹, R² and R³ are the same or different and are selected from the group consisting of hydrogen, halide, a substituted or unsubstituted C₁-C₂₀ alkyl group, an substituted or unsubstituted C₅-C₃₀ aryl group and a substituted or unsubstituted C₅-C₄₀ alkylaryl group; R⁴ and R⁵ are the same or different and are selected from the group consisting of hydrogen, a substituted or unsubstituted C₁-C₂₀ alkyl group, an substituted or unsubstituted C₅-C₃₀ aryl

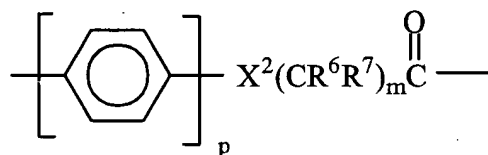
group and a substituted or unsubstituted C₅-C₄₀ alkylaryl group;

X¹ is selected from the group consisting of -O-, -S-, -C(O)-, -S(O)₂-, and -N(R)-;

R is selected from the group consisting of hydrogen, a substituted or unsubstituted C₁-C₂₀ alkyl group, an substituted or unsubstituted C₅-C₃₀ aryl group and a substituted or unsubstituted C₅-C₄₀ alkylaryl group;

n is 0, 1 or 2;

and one of A¹ and B¹ is selected from the group consisting of hydrogen, halide, a substituted or unsubstituted C₁-C₂₀ alkyl group, an substituted or unsubstituted C₅-C₃₀ aryl group and a substituted or unsubstituted C₅-C₄₀ alkylaryl group and the other of A¹ and B¹ has the formula:



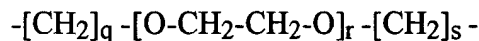
wherein p is 0 or 1;

X² is selected from the group consisting of -O-, -S-, -C(O)-, -S(O)₂-, and -N(R)-;

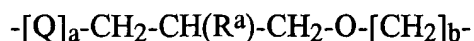
R is selected from the group consisting of hydrogen, a substituted or unsubstituted C₁-C₂₀ alkyl group, an substituted or unsubstituted C₅-C₃₀ aryl group and a substituted or unsubstituted C₅-C₄₀ alkylaryl group;

R⁶ and R⁷ are the same or different and are selected from the group consisting of hydrogen, a substituted or unsubstituted C₁-C₂₀ alkyl group, an substituted or unsubstituted C₅-C₃₀ aryl group and a substituted or unsubstituted C₅-C₄₀ alkylaryl group;

and T has the formula:

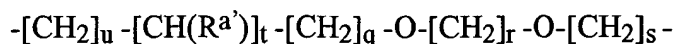


wherein q and s are the same or different and each is an integer having a value of 0-40 and r is an integer having a value of 1-200 or T has the formula:



wherein a is 0 or 1,

R^a is selected from -OH, -NH₂, -NHR and -OR wherein R is a protecting group and b is an integer having a value of 0-40, and Q is moiety having the formula:



wherein q, r, s, t and u are the same or different and each is an integer having a value of 0-40 and R^a is selected from the group consisting of hydrogen, hydroxyl, a C₁-C₄₀ alkyl group, a C₅-C₄₀ aryl group, a C₁-C₄₀ alkoxy group, a C₁-C₄₀ ester group, a C₁-C₄₀ hydroxy-containing group, a C₂-C₄₀ acrylate-containing group, a C₅-C₄₀ alkylaryl group, -NH₂, -NHR and -OR, wherein R is a protecting group; and wherein the term SUPPORT is defined as an organic or an inorganic substance and wherein the term NUCLEOSIDE represents an optionally protected ribonucleosidyl or 2'-deoxyribonucleosidyl group. --

In claim 70 at lines 7 and 8, the term "R^a" (both occurrences) was amended to read -- R^a --.

In claim 73 at line 3, the term "dialkylphosphite," was deleted.

In claim 73 at line 10, the terms "dimethoxybenzoin," "dimethoxybenzoin carbonate," and "methylnitropiperonyl carbonate," were deleted.

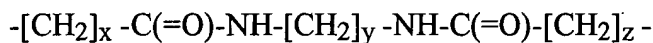
In claim 73 at lines 7 and 8, the term "R^a" (both occurrences) was amended to read -- R^a --.

In claim 78 at line 34, the term "-NR" was amended to read -- -NHR --.

In claim 89 at lines 1-2, the term "organic moiety" was amended to read -- moiety Q --.

Claim 90 was replaced entirely by the following:

-- 90. The reusable linker arm defined in claim 18 wherein Q is additionally defined as having the formula:



wherein each of x, y and z is an integer having a value of 1-40. --

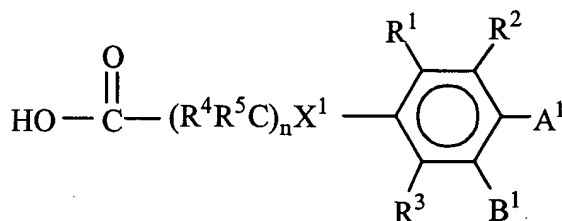
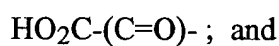
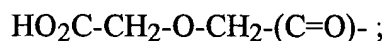
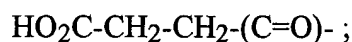
In claim 96 at line 3, the term "C₅-1C₄₀" was amended to read -- "C₅-C₄₀" -- .

Claim 106 was entirely replaced with the following:

--106. A process for production of a reusable linker arm for oligonucleotide synthesis having the following formula:



wherein Z is selected from the group consisting of:

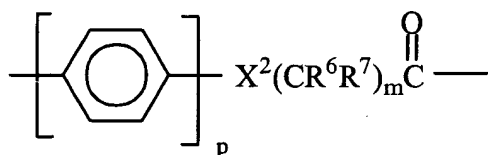


wherein: R¹, R² and R³ are the same or different and are selected from the group consisting of hydrogen, halide, a substituted or unsubstituted C₁-C₂₀ alkyl group, an substituted or unsubstituted C₅-C₃₀ aryl group and a substituted or unsubstituted C₅-C₄₀ alkylaryl group; R⁴ and R⁵ are the same or different and are selected from the group consisting of hydrogen, a substituted or unsubstituted C₁-C₂₀ alkyl group, an substituted or unsubstituted C₅-C₃₀ aryl group and a substituted or unsubstituted C₅-C₄₀ alkylaryl group; X¹ is selected from the group consisting of -O-, -S-, -C(O)-, -S(O)₂-, and -N(R)-; R is selected from the group consisting of hydrogen, a substituted or unsubstituted C₁-C₂₀ alkyl group, an substituted or unsubstituted C₅-C₃₀ aryl group and a substituted or

unsubstituted C₅-C₄₀ alkylaryl group;

n is 0, 1 or 2;

and one of A¹ and B¹ is selected from the group consisting of hydrogen, halide, a substituted or unsubstituted C₁-C₂₀ alkyl group, an substituted or unsubstituted C₅-C₃₀ aryl group and a substituted or unsubstituted C₅-C₄₀ alkylaryl group and the other of A¹ and B¹ has the formula:



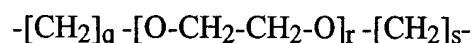
wherein p is 0 or 1;

X² is selected from the group consisting of -O-, -S-, -C(O)-, -S(O)₂-, and -N(R)-;

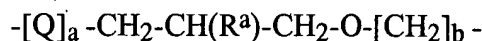
R is selected from the group consisting of hydrogen, a substituted or unsubstituted C₁-C₂₀ alkyl group, an substituted or unsubstituted C₅-C₃₀ aryl group and a substituted or unsubstituted C₅-C₄₀ alkylaryl group;

R⁶ and R⁷ are the same or different and are selected from the group consisting of hydrogen, a substituted or unsubstituted C₁-C₂₀ alkyl group, an substituted or unsubstituted C₅-C₃₀ aryl group and a substituted or unsubstituted C₅-C₄₀ alkylaryl group;

and T has the formula:

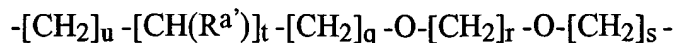


wherein q and s are the same or different and each is an integer having a value of 0-40 and r is an integer having a value of 1-200 or T has the formula:

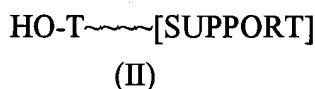
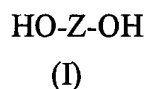


wherein a is 0 or 1,

R^a is selected from -OH, -NH₂, -NHR and -OR wherein R is a protecting group and b is an integer having a value of 0-40, and Q is moiety having the formula:



wherein q, r, s, t and u are the same or different and each is an integer having a value of 0-40 and R^a is selected from the group consisting of hydrogen, hydroxyl, a C_1 - C_{40} alkyl group, a C_5 - C_{40} aryl group, a C_1 - C_{40} alkoxy group, a C_1 - C_{40} ester group, a C_1 - C_{40} hydroxy-containing group, a C_2 - C_{40} acrylate-containing group, a C_5 - C_{40} alkylaryl group, $-\text{NH}_2$, $-\text{NHR}$ and $-\text{OR}$, wherein R is a protecting group, the process comprising a sequence of steps or reacting together the compounds of the Formulae I and II



in the presence of an activating agent; and
wherein Z and T are as defined above; and
wherein the term SUPPORT is defined as an organic or an inorganic substance. --

In claim 119 at line 1, the term "organic moiety" was amended to read -- moiety Q -- .

In claim 120 at line 1, the term "organic moiety" was amended to read -- moiety Q -- .

In claim 123 at line 3, the term " $-\text{NR}$ " was amended to read
-- $-\text{NHR}$ -- .

In claim 123 at lines 6 and 7, the term " R^a " (both occurrences) was amended to read -- R^a -- .

In claim 126 at line 3, the term "dialkylphosphite," was deleted.

In claim 126 at line 10, the terms "dimethoxybenzoin," "dimethoxybenzoin carbonate," and "methylnitropiperonyl carbonate," were deleted.

Claim 141 was cancelled.

In claim 142 at line 1, the term "claim 141" was amended to read -- claim 106 -- .

In claim 143 at line 2, the term "arylsulfonyl chlorides" was amended to read -- one or more arylsulfonyl chlorides --.

In claim 143 at line 5, the term "acyl carbonates" was amended to read -- one or more acyl carbonates --.

In claim 143 at line 6, the term
"1, 1'-(carbonyldioxybenzotriazoles" was amended to read
-- one or more 1, 1'-(carbonyldioxybenzotriazoles -- .

In claim 143 at line 6, the term "chlorotri-methyl-silane" was amended to read -- chlorotrimethylsilane -- .

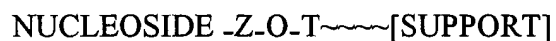
In claim 143 at line 6, the term "carbodiimides" was amended to read -- one or more carbodiimides -- .

In claim 143 at line 25, the term "a catalyst" was deleted.

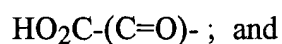
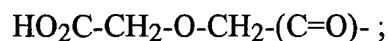
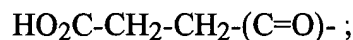
In claim 143 at lines 32-33, the term "mixtures thereof and mixtures thereof with auxiliary nucleophiles" was amended to read
-- or mixtures thereof -- .

Claim 144 was replaced entirely by the following:

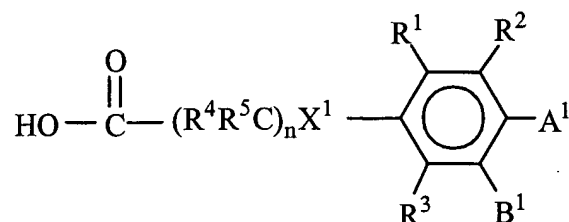
--144. A process for production of a reusable linker arm for oligonucleotide synthesis having the following formula:



wherein Z is selected from the group consisting of:



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wherein: R^1 , R^2 and R^3 are the same or different and are selected from the group consisting of hydrogen, halide, a substituted or unsubstituted C_1 - C_{20} alkyl group, an substituted or unsubstituted C_5 - C_{30} aryl group and a substituted or unsubstituted C_5 - C_{40} alkylaryl group;

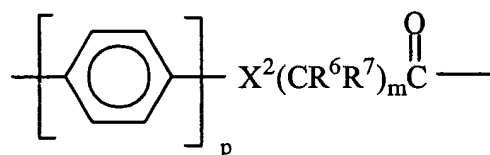
R^4 and R^5 are the same or different and are selected from the group consisting of hydrogen, a substituted or unsubstituted C_1 - C_{20} alkyl group, an substituted or unsubstituted C_5 - C_{30} aryl group and a substituted or unsubstituted C_5 - C_{40} alkylaryl group;

X^1 is selected from the group consisting of -O-, -S-, -C(O)-, -S(O)₂-, and -N(R)-;

R is selected from the group consisting of hydrogen, a substituted or unsubstituted C_1 - C_{20} alkyl group, an substituted or unsubstituted C_5 - C_{30} aryl group and a substituted or unsubstituted C_5 - C_{40} alkylaryl group;

n is 0, 1 or 2;

and one of A^1 and B^1 is selected from the group consisting of hydrogen, halide, a substituted or unsubstituted C_1 - C_{20} alkyl group, an substituted or unsubstituted C_5 - C_{30} aryl group and a substituted or unsubstituted C_5 - C_{40} alkylaryl group and the other of A^1 and B^1 has the formula:



wherein p is 0 or 1;

X^2 is selected from the group consisting of -O-, -S-, -C(O)-, -S(O)₂-, and -N(R)-;

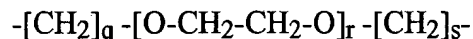
R is selected from the group consisting of hydrogen, a substituted or unsubstituted C_1 - C_{20} alkyl group, an substituted or unsubstituted C_5 - C_{30} aryl group and a substituted or

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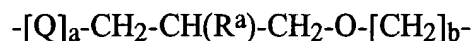
unsubstituted C₅-C₄₀ alkylaryl group;

R⁶ and R⁷ are the same or different and are selected from the group consisting of hydrogen, a substituted or unsubstituted C₁-C₂₀ alkyl group, an substituted or unsubstituted C₅-C₃₀ aryl group and a substituted or unsubstituted C₅-C₄₀ alkylaryl group;

and T has the formula:

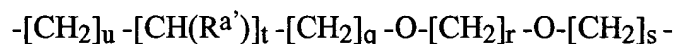


wherein q and s are the same or different and each is an integer having a value of 0-40 and r is an integer having a value of 1-200 or T has the formula:



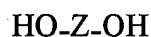
wherein a is 0 or 1,

R^a is selected from -OH, -NH₂, -NHR and -OR wherein R is a protecting group and b is an integer having a value of 0-40, and Q is moiety having the formula:



wherein q, r, s, t and u are the same or different and each is an integer having a value of 0-40 and R^{a'} is selected from the group consisting of hydrogen, hydroxyl, a C₁-C₄₀ alkyl group, a C₅-C₄₀ aryl group, a C₁-C₄₀ alkoxy group, a C₁-C₄₀ ester group, a C₁-C₄₀ hydroxy-containing group, a C₂-C₄₀ acrylate-containing group, a C₅-C₄₀ alkylaryl group, -NH₂, -NHR and -OR, wherein R is a protecting group,

the process comprising a sequence of steps or reacting together the compounds having Formulae I, II and III in the presence of an activating agent



(I)



(II)



(III)

wherein Z and T are as defined above and;
wherein the term SUPPORT is defined as an organic or an inorganic substance; and wherein the term NUCLEOSIDE represents an optionally protected ribonucleosidyl or 2'-deoxyribonucleosidyl group;
with the proviso that said compounds are reacted in the pairs I + II, or I + III, prior to the coupling of the resultant intermediate product with the remaining compound. --

In claim 157 at line 1, the term "organic moiety" was amended to read -- moiety Q --.

In claim 158 at line 1, the term "organic moiety" was amended to read -- moiety Q --.

In claim 161 at line 3, the term "-NR" was amended to read
-- -NHR --.

In claim 161 at lines 6 and 7, the term "R^a" (both occurrences) was amended to read -- R^a' --.

In claim 164 at line 3, the term "dialkylphosphite," was deleted.

In claim 164 at line 10, the terms "dimethoxybenzoin," "dimethoxybenzoin carbonate," and "methylnitropiperonyl carbonate," were deleted.

Claim 179 was deleted.

In claim 180 at line 5, the term "mixed anhydride" was amended to read -- mixed acid anhydride --.

Claim 181 was replaced entirely by the following:

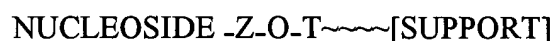
--181. The process defined in claim 179, wherein the activating agent is selected from the group consisting of one or more arylsulfonyl chlorides, one or more active arylsulfonyl esters, 2-ethoxy-1-(ethoxycarbonyl)-1,2-dihydroquinoline (EEDQ), one or more acyl carbonates, one or more 1,1'-(carbonyldioxy)dibenzotriazoles, chlorotrimethylsilane, and one or more carbodiimides;
alone or in combination with a catalyst, one or more uronium salts, or one or more

phosphonium salts; or mixtures thereof, or mixtures thereof with auxiliary nucleophiles. --

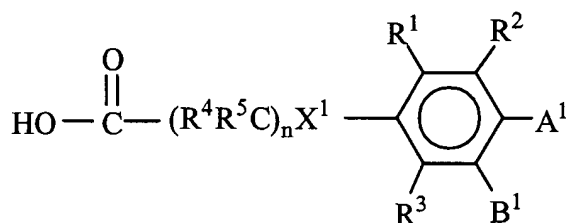
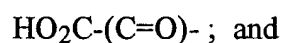
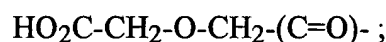
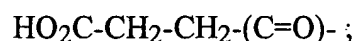
Claim 185 was replaced entirely by the following:

-- 185. A process for producing an oligonucleotide having a desired sequence comprising the steps of:

(i) reacting a linker arm having the formula:



wherein Z is selected from the group consisting of:



wherein: R^1 , R^2 and R^3 are the same or different and are selected from the group consisting of hydrogen, halide, a substituted or unsubstituted C_1 - C_{20} alkyl group, an substituted or unsubstituted C_5 - C_{30} aryl group and a substituted or unsubstituted C_5 - C_{40} alkylaryl group;

R^4 and R^5 are the same or different and are selected from the group consisting of hydrogen, a substituted or unsubstituted C_1 - C_{20} alkyl group, an substituted or unsubstituted C_5 - C_{30} aryl group and a substituted or unsubstituted C_5 - C_{40} alkylaryl group;

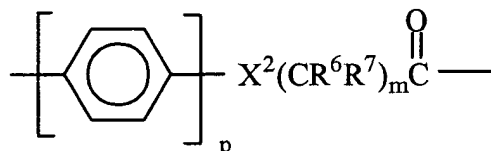
X^1 is selected from the group consisting of $-\text{O}-$, $-\text{S}-$, $-\text{C}(\text{O})-$, $-\text{S}(\text{O})_2-$, and $-\text{N}(\text{R})-$;

R is selected from the group consisting of hydrogen, a substituted or unsubstituted C_1 - C_{20} alkyl group, an substituted or unsubstituted C_5 - C_{30} aryl group and a substituted or unsubstituted C_5 - C_{40} alkylaryl group;

n is 0, 1 or 2;

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and one of A¹ and B¹ is selected from the group consisting of hydrogen, halide, a substituted or unsubstituted C₁-C₂₀ alkyl group, an substituted or unsubstituted C₅-C₃₀ aryl group and a substituted or unsubstituted C₅-C₄₀ alkylaryl group and the other of A¹ and B¹ has the formula:



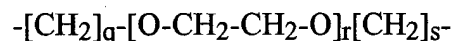
wherein p is 0 or 1;

X² is selected from the group consisting of -O-, -S-, -C(O)-, -S(O)₂-, and -N(R)-;

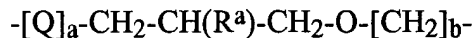
R is selected from the group consisting of hydrogen, a substituted or unsubstituted C₁-C₂₀ alkyl group, an substituted or unsubstituted C₅-C₃₀ aryl group and a substituted or unsubstituted C₅-C₄₀ alkylaryl group;

R⁶ and R⁷ are the same or different and are selected from the group consisting of hydrogen, a substituted or unsubstituted C₁-C₂₀ alkyl group, an substituted or unsubstituted C₅-C₃₀ aryl group and a substituted or unsubstituted C₅-C₄₀ alkylaryl group;

and T has the formula:

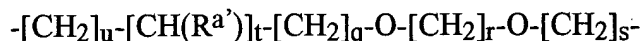


wherein q and s are the same or different and each is an integer having a value of 0-40 and r is an integer having a value of 1-200 or T has the formula:



wherein a is 0 or 1,

R^a is selected from -OH, -NH₂, -NHR and -OR wherein R is a protecting group and b is an integer having a value of 0-40, and Q is moiety having the formula:



wherein q, r, s, t and u are the same or different and each is an integer having a value of 0-40 and R^a is selected from the group consisting of hydrogen, hydroxyl, a C_1 - C_{40} alkyl group, a C_5 - C_{40} aryl group, a C_1 - C_{40} alkoxy group, a C_1 - C_{40} ester group, a C_1 - C_{40} hydroxy-containing group, a C_2 - C_{40} acrylate-containing group, a C_5 - C_{40} alkylaryl group, $-\text{NH}_2$, $-\text{NHR}$ and $-\text{OR}$, wherein R is a protecting group, with at least one activated nucleotide monomer until an oligonucleotide having the desired sequence is produced;

(ii) cleaving the oligonucleotide having the desired sequence to produce a free oligonucleotide having the desired sequence; and a used linker arm; and

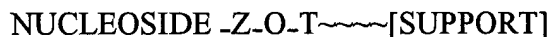
(iii) isolating the used linker arm; and

wherein the term SUPPORT is defined as an organic or an inorganic substance; and wherein the term NUCLEOSIDE represents an optionally protected ribonucleosidyl or 2'-deoxyribonucleosidyl group. --

In claim 186 at line 4, the term "Z and T" was amended to read
-- Z, T and SUPPORT -- .

Claim 187 was replaced in its entirety by the following:

-- 187. The process defined in claim 185, wherein Step (iii) further comprises the additional step of converting the used linked arm to a linker arm having the formula:



wherein Z, T, NUCLEOSIDE and SUPPORT are as defined in claim 185; and

wherein the additional step comprises contacting the used linker arm with an activating agent in the presence of an appropriately protected NUCLEOSIDE. --

Authorization for this Examiner's Amendment was given in a telephone interview with Mr. Dawn C. Hayes on June 1, 2005.

Papers related to this application may be submitted to Group 1600 via facsimile transmission (FAX). The transmission of such papers must conform with the notice published in the Official Gazette (1096 OG 30, November 15, 1989). The telephone number to FAX (unofficially) directly to Examiner's computer is 571-273-0651. The telephone number for sending an Official FAX to the PTO is 703-872-9306.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner L. E. Crane whose telephone number is **571-272-0651**. The examiner can normally be reached between 9:30 AM and 5:00 PM, Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. James O. Wilson, can be reached at **571-272-0661**.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group 1600 receptionist whose telephone number is **571-272-1600**.

All Post-Allowance Correspondence concerning this application must be mailed to:

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COMMISSIONER FOR PATENTS
WASHINGTON, DC 20231

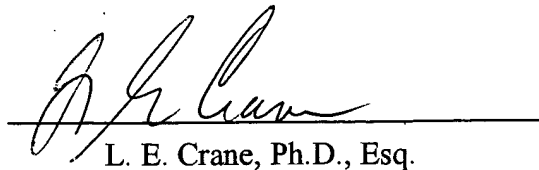
OR you can FAX them to the Office of Patent Publications at 703-308-5083, in order to expedite the handling of such correspondence as amendments under 37 C.F.R. §1.312; Information Disclosure Statements (IDS's), and formal drawings. Sending Post-Allowance papers to Technology Center 1600 will only cause delays in matching papers with the case.

For information concerning status of correspondence sent after receipt of the Notice of Allowance, please contact the Correspondence Branch at **703-305-8027**. The Notice of Allowance also has an insert containing contact information for other items, including Issue Fees, receipt of formal drawings, and the status of the application.

LECrane:lec
06/08/2005

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A handwritten signature in cursive script, appearing to read "L. E. Crane", is written over a horizontal line.

L. E. Crane, Ph.D., Esq.

Primary Patent Examiner

Technology Center 1600